3.3.5.7 Northern Wet-Mesic Forest

3.3.5.7.1 Community Overview

This forested minerotrophic wetland is dominated by northern white cedar, and occurs on rich, neutral to alkaline peats and mucks throughout much of northern Wisconsin. Balsam fir, black ash, and spruces are among the many potential canopy associates. The understory is rich in mosses, lichens, liverworts, ferns, sedges, orchids, and wildflowers such as goldthread, fringed polygala, and naked miterwort, and trailing sub-shrubs such as twinflower and creeping snowberry. A number of rare plants occur more frequently in the cedar swamps than in any other habitat. Older cedar swamps are often structurally complex, as the easily wind-thrown cedars are able to root from their branch tips. Some of the canopy associates have the potential to reach heights considerably beyond those usually attained by cedar, producing a multi-layered canopy. The tall shrub layer is often well-developed and may include speckled alder, alder-leaved buckthorn, wild currants, and mountain maple. Canada yew was formerly an important tall shrub in cedar swamps but is now rare or local.

Seepages, springs, and spring runs contribute to stand complexity and provide critical habitat for additional plants and animals. Cedar swamps are relatively common in depressions that receive mineral-enriched groundwater, and can be associated with both ground moraine and outwash landforms.

3.3.5.7.2 Vertebrate Species of Greatest Conservation Need Associated with Northern Wet-Mesic Forest

Thirteen vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with northern wet-mesic forest (Table 3-130).

Table 3-130. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with northern wet-mesic forest communities.

Species Significantly Associated with Northern Wet-Mesic Forest
Birds
Canada Warbler
Herptiles
Four-toed Salamander
Mammals
Water Shrew
Northern Flying Squirrel
Gray Wolf
Moose
Species Moderately Associated with Northern Wet-Mesic Forest
Birds
Olive-sided Flycatcher
Herptiles
Pickerel Frog
Wood Turtle
Mammals
Silver-haired Bat
Eastern Red Bat
Hoary Bat
Woodland Jumping Mouse

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-130 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both northern wet-mesic forest and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of northern wet-mesic forest in each of the Ecological Landscapes (Tables 3-131 and 3-132).

- Using the analysis described above, a species was further selected if it had both a significant association with northern wet-mesic forest and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of northern wet-mesic forest. These species are shown in Figure 3-29.

Table 3-131. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with northern wet-mesic forest communities and their association with Ecological Landscapes that support northern wet-mesic forest.

Northern Wet-Mesic Forest	Birds (1)*	Herptiles (1)	Mammals (4)			
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Canada Warbler	Four-toed Salamander	Water Shrew	Northern Flying Squirrel	Gray Wolf	Moose
MAJOR						
Forest Transition	MODERATE	HIGH	MODERATE	MODERATE	MODERATE	
North Central Forest	HIGH	HIGH	HIGH	HIGH	HIGH	MODERATE
Northeast Sands	MODERATE	MODERATE	HIGH	HIGH	MODERATE	
Northern Lake Michigan Coastal	HIGH	MODERATE	HIGH	HIGH	MODERATE	
IMPORTANT						
Central Lake Michigan Coastal	MODERATE	HIGH				
Northern Highland	HIGH	HIGH	HIGH	HIGH	HIGH	MODERATE
Northwest Lowlands	HIGH	HIGH	HIGH	HIGH	HIGH	MODERATE
Northwest Sands	MODERATE	MODERATE	HIGH	HIGH	HIGH	
Southeast Glacial Plains		HIGH				
Superior Coastal Plain	HIGH	HIGH	HIGH	HIGH	HIGH	MODERATE
PRESENT (MINOR)						
Central Sand Hills		MODERATE	MODERATE		MODERATE	
Southern Lake Michigan Coastal						
Western Coulee and Ridges		HIGH				

Color Key

- HIGH = **HIGH probability the species occurs in this Ecological Landscape**
- MODERATE = **MODERATE probability the species occurs in this Ecological Landscape**
- = **LOW or NO probability the species occurs in this Ecological Landscape**

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

Table 3-132. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with northern wet-mesic forest communities and their association with Ecological Landscapes that support northern wet-mesic forest.

Northern Wet-Mesic Forest	Birds (1)*	Herptiles (2)		Mammals (4)			
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Olive-sided Flycatcher	Pickerel Frog	Wood Turtle	Silver-haired Bat	Eastern Red Bat	Hoary Bat	Woodland Jumping Mouse
MAJOR							
Forest Transition							
North Central Forest							
Northeast Sands							
Northern Lake Michigan Coastal							
IMPORTANT							
Central Lake Michigan Coastal							
Northern Highland							
Northwest Lowlands							
Northwest Sands							
Southeast Glacial Plains							
Superior Coastal Plain							
PRESENT (MINOR)							
Central Sand Hills							
Southern Lake Michigan Coastal							
Western Coulee and Ridges							

Color Key

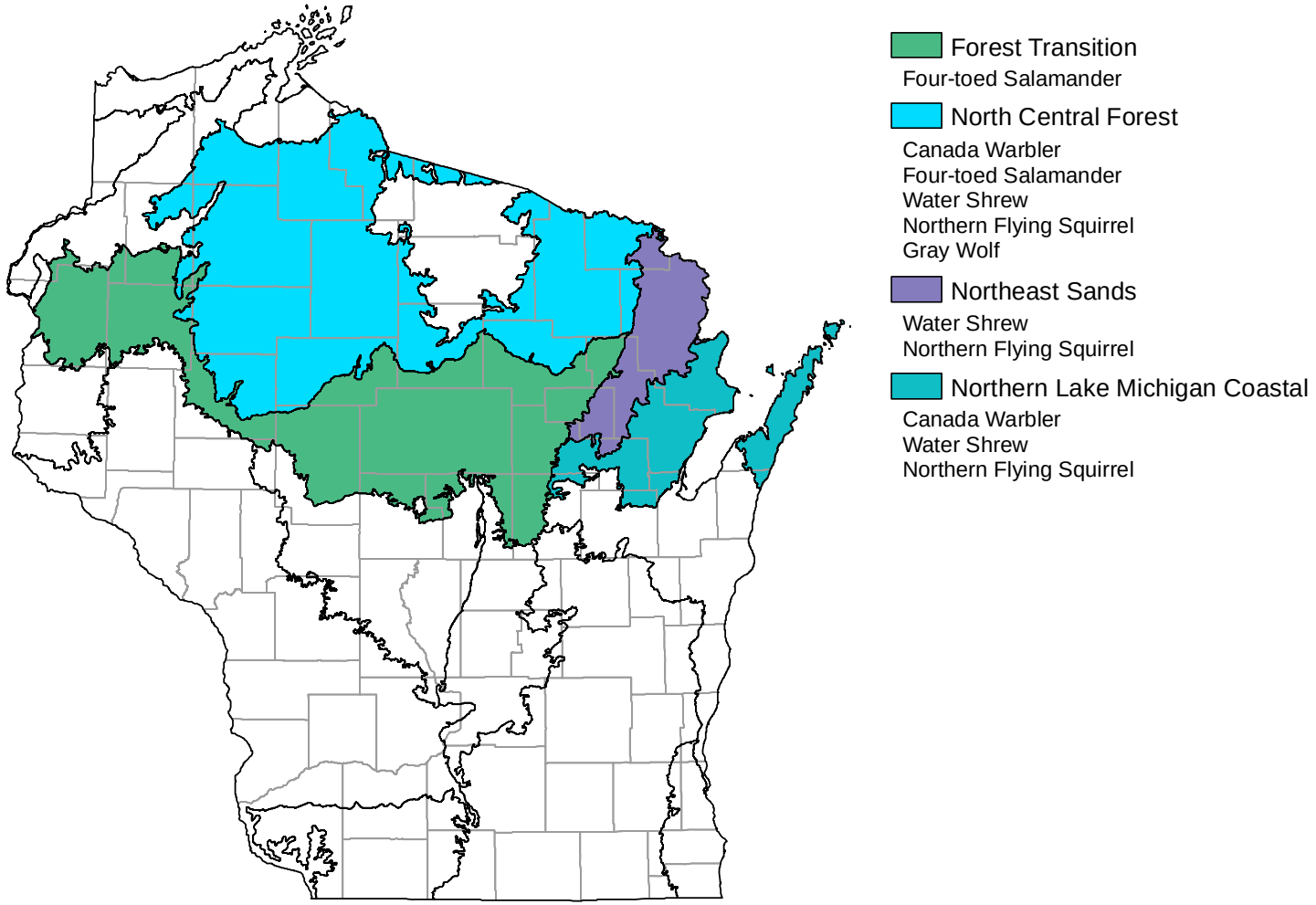
= **HIGH probability the species occurs in this Ecological Landscape**

= **MODERATE probability the species occurs in this Ecological Landscape**

= **LOW or NO probability the species occurs in this Ecological Landscape**

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

Figure 3-29. Vertebrate Species of Greatest Conservation Need that have ***both* a significant association with northern wet-mesic forest ***and*** a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of northern wet-mesic forest.**



3.3.5.7.3 Threats and Priority Conservation Actions for Northern Wet-Mesic Forest

3.3.5.7.3.1 Statewide Overview of Threats and Priority Conservation Actions for Northern Wet-Mesic Forest

The following list of threats and priority conservation actions has been identified for northern wet-mesic forest in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.5.73.3.2 unless otherwise indicated.

Threats

- Changes in hydrology from roads and other right-of-way construction can be detrimental to this community type.
- Flooding by beaver can convert these types to alder and/or black ash.
- Unsustainable forest management practices can result in soil compaction, erosion and water quality issues, or conversion of the type.
- Reliable regeneration techniques are lacking. The practice of strip-cutting, widely implemented in the cedar swamps of northeastern Wisconsin on federal lands during the 1970s in the hopes that it would promote cedar regeneration, was generally unsuccessful here. Regeneration problems were exacerbated, habitat fragmentation was increased, some rare species habitat was lost, and cedar-dominated habitat was converted to shrub swamp.
- Deer herbivory is a major problem affecting forest regeneration. Regeneration problems are occurring in all Ecological Landscapes where the type occurs, due in part to excessive browse pressure, and successful management of this type over the long-term will need to take landscape factors into account (especially the density and distribution of white-tailed deer).
- Some cedar stands have been managed as deeryards, resulting in long-term damage. The unsustainable practice of felling cedars to provide forage for wintering deer has been stopped or curtailed on at least some publicly-owned lands, but continues elsewhere.
- Livestock grazing has negatively impacted stands in some areas, such as the Forest Transition Ecological Landscape.
- Invasive species are a problem in some areas, (e.g., glossy buckthorn is now a serious problem in cedar swamps near the southern edge of the range for this type). Other invasives could be problematic in the future including Asian honeysuckles, European swamp and Canada thistles, moneywort, creeping Charlie, and garlic mustard.

Conservation actions

- Many sites with high biological diversity value have been identified. Large blocks of this habitat are needed by certain area-sensitive or disturbance-sensitive species.
- Hydrologic function is critical in regulating these communities, so hydrology should be protected or restored where possible.
- Isolated sites should be embedded in other forest habitats where possible.
- Discourage practices that lead to excessive deer browsing.
- Opportunities to manage for many sensitive species are present.
- Invasives should be monitored and controlled.
- Best Management Practices and other sustainable forest management practices should be developed and applied to ensure regeneration success. Prescribed burning should be further investigated, in combination with other management techniques.
- Continued monitoring and additional research are needed to understand the composition, disturbance regimes and dynamics needed by this system.

3.3.5.7.3.2 Additional Considerations for Northern Wet-Mesic Forest by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of northern wet-mesic forest exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for northern wet-mesic forest found in Section 3.3.5.73.3.1.

Additional Considerations for Northern Wet-Mesic Forest in Ecological Landscapes with ***Major*** Opportunities for Protection, Restoration, and/or Management of Northern Wet-Mesic Forest

Forest Transition

Historically, cedar forest was rare here; what there was occurred mostly in the eastern part of the Ecological Landscape in what is now the Chequamegon-Nicolet National Forest and on the Menominee Reservation.

North Central Forest

Sites on the Chequamegon-Nicolet National Forest are often found in wetlands fed by nutrient-enriched groundwater, including areas between drumlins on loamy till soils. Popple River Cedars and Jones Swamp in the Nicolet National Forest feature cedar-dominated forests. In the North Central Forest, much of the type has been converted, or is converting to other types, and restoration methods are lacking. Over the long term, opportunities for restoration in this landscape are high because of the abundance of forested lands and the extent of public ownership.

Northeast Sands

The combination of glacial outwash sands and alkaline groundwater make this a significant landscape for this type. Examples include Miscauno Cedars State Natural Area (Marinette County), Waupee Lake Research Natural Area (Oconto County, on the Chequamegon-Nicolet National Forest), and Brazeau Swamp (Marinette County Forest). Several of the largest and least disturbed stands known from the upper Midwest occur on tribal reservation lands.

Northern Lake Michigan Coastal

Forests dominated by northern white cedar were historically common within this Ecological Landscape, particularly on dolomite outcrops. Opportunities exist for protecting more of this type, but land prices are often prohibitively high. Partnerships with land trusts and other conservation organizations should continue to be encouraged to protect additional northern wet-mesic forest sites through acquisition, conservation easements, and incentive programs.

Additional Considerations for Northern Wet-Mesic Forest in Ecological Landscapes with ***Important*** Opportunities for Protection, Restoration, and/or Management of Northern Wet-Mesic Forest

Central Lake Michigan Coastal

Local abundances of cedar-dominated forest occurred historically, associated with the Niagara Escarpment in the northeastern portion of this Ecological Landscape. Extensive land development has reduced the abundance of this type, and restricted opportunities for conservation.

Northern Highland

Only a few occurrences of this type are known from this Ecological Landscape, but several of them are exceptional for their size, the mosaic of associated communities, and very high plant and animal diversity. These include Toy Lake Swamp and Rice Creek Cedars and Fen (proposed State Natural Areas in Vilas County), and Trout Lake Conifer Swamp State Natural Area (Vilas County).

Northwest Lowlands

Several large occurrences of this type were present historically, but few remain today. Existing sites merit protection.

Northwest Sands

One major historic occurrence is known, adjacent to the Northwest Lowlands Ecological Landscape.

Southeast Glacial Plains

Though this type is of limited occurrence here, several important examples persist along the eastern margins of the Ecological Landscape, very close to the climatic Tension Zone. Cedarburg Bog State Natural Area (Ozaukee County) and Jackson Marsh State Wildlife Area (Washington County) provide habitat for many plants and animals that are rare or absent elsewhere in southeastern Wisconsin. Excessive deer browse and invasive plants are major problems at both of these sites.

Superior Coastal Plain

Historically, the northern wet-mesic forest intergraded with the boreal forest. There are opportunities for restoring and protecting this community and managing it as a block with boreal forest and hemlock-hardwoods.

On the Apostle Islands, white cedar occurs in an unusual mix with eastern hemlock (often dominant), red maple, eastern white pine, mountain maple, and Canada yew. Northern white cedar is reproducing well on the Apostle Islands.